

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

Page 36, lines 13-17:

B31 The invention of the thirty-second aspect is the semiconductor manufacturing apparatus according to the invention of the thirty-first aspect, wherein rotary drive components that are adjacent in the vertical direction are disposed so as to have different centers of rotation.

Page 36, lines 25-29, delete current paragraph and insert therefor:

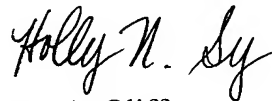
B32 The invention of the thirty-third aspect is the semiconductor manufacturing apparatus according to the invention of the twenty-sixth aspect, wherein the substrate support components are transparent. Transparent members are made up of members that are transparent to the light handled by the optical sensor.

REMARKS

Claims 1-15 are pending. By this Amendment, the specification is amended to address minor informalities. No new matter has been added.

Prompt and favorable examination on the merits is respectfully solicited.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Holly N. Sy
Registration No. P-50,212

JAO:HNS/cfr

Attachment:
Appendix

Date: March 20, 2002

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
--

APPENDIX

Changes to Specification:

Page 4, lines 20-26:

The invention of ~~Claim 1~~ the first aspect is a semiconductor manufacturing method including a step of detecting the position of the orientation flat or notch of a substrate and aligning to a specific position, wherein a substrate transfer unit that transfers substrates to a processing chamber or processing jig is used for the orientation flat or notch alignment of the substrates.

Page 5, lines 6-10:

The invention of ~~Claim 2~~ the second aspect is the semiconductor manufacturing method according to ~~Claim 1~~ the invention of the first aspect, wherein the orientation flat or notch alignment of the substrates is performed in a transfer chamber in which the substrate transfer unit is installed.

Page 5, lines 19-28:

The invention of ~~Claim 3~~ the third aspect is a semiconductor manufacturing method according to ~~Claim 1~~ the invention of the first aspect, wherein the substrates are removed from a substrate carrier by the substrate transfer unit and put into a substrate alignment apparatus that performs the orientation flat or notch alignment of the substrates, and the substrates are taken out of the substrate alignment apparatus by the substrate transfer unit after the orientation flat or notch alignment of the substrates and transferred to the processing chamber or processing jig.

Page 6, lines 8-26:

The invention of ~~Claim 4~~ the fourth aspect is the semiconductor manufacturing method according to ~~Claim 1~~ the invention of the first aspect, wherein the orientation flat or notch alignment of the substrates is performed ahead of time by exchanging substrate carriers and repeating the following steps (a) to (d): (a) the substrates are removed from the substrate carrier by the substrate transfer unit and put into a substrate alignment apparatus that performs the orientation flat or notch alignment of the substrates, and orientation flat or notch alignment of the substrates, and orientation flat or notch alignment of the substrates is performed, (b) the substrates that have undergone orientation flat or notch alignment are taken out of the substrate alignment apparatus and returned to the substrate carrier by the substrate transfer unit, (c) repeating the above steps (a) and (b) until the orientation flat or notch alignment is finished for all of the substrates in the substrate carrier, and (d) the substrate carrier for which the orientation flat or notch alignment of the substrates has been finished is stored on a storage shelf.

Page 7, lines 10-23:

The invention of ~~Claim 5~~ the fifth aspect is the semiconductor manufacturing method according to ~~Claim 4~~ the invention of the fourth aspect, including a step in which, if the orientation flat or notch alignment of the substrates in the substrate carrier has been performed ahead of time, this information is stored, a decision as to whether the substrates to be transferred have already undergone orientation flat or notch alignment is made on the basis of this information, and if the substrates to be transferred have already undergone orientation flat or notch alignment, then the substrates are taken out of the substrate carrier by the substrate transfer unit and transferred directly to the processing chamber or processing jig without first going through the substrate alignment apparatus.

Page 8, lines 13-20:

The invention of ~~Claim 6~~ the sixth aspect is a semiconductor manufacturing method including a step of detecting the position of the orientation flat or notch of a substrate and aligning to a specific position, wherein the orientation flat or notch alignment of each substrate is performed by placing the substrate horizontally and rotating it while the outer periphery of the substrate is supported by a substrate support component.

Page 9, lines 3-10:

The invention of ~~Claim 7~~ the seventh aspect is the semiconductor manufacturing method according to ~~Claim 6~~ the invention of the sixth aspect, including a step in which the substrate is temporarily retracted from the substrate support component, and the relative positions of the substrate and the substrate support component in the peripheral direction are shifted, after which the retracted substrate is once again supported by the substrate support component.

Page 10, line 25 - page 11, line 6:

The invention of ~~Claim 8~~ the eighth aspect is the semiconductor manufacturing method according to ~~Claim 7~~ the invention of the seventh aspect, wherein, in the shifting of the relative positions of the substrate and the substrate support component in the peripheral direction, the position of the substrate support component is corrected so that the orientation flat or notch of the substrate will not overlap with the substrate support component, and so that the substrate support component will not block the forward path of the substrate transfer unit as the substrate is taken out of the substrate support component by the substrate transfer unit.

Page 12, lines 16-26:

The invention of ~~Claim 9~~ the ninth aspect is the semiconductor manufacturing method according to ~~Claim 8~~ the invention of the eighth aspect, wherein, if there is overlap between

the substrate support component and the orientation flat or notch of the substrate while the substrate outer periphery is supported by the substrate support component, the substrate is temporarily retracted from said substrate support component and the relative positions of the substrate and the substrate support component in the peripheral direction are shifted, after which the substrate is once again supported by the substrate support component, thereby avoiding the overlap.

Page 14, lines 9-17:

The invention of ~~Claim 10~~ the tenth aspect is the semiconductor manufacturing method according to ~~Claim 8~~ the invention of the eighth aspect, wherein the substrate is temporarily retracted from said substrate support component after the orientation flat or notch alignment of the substrate, and the substrate support component is set in a tolerance position that doesn't block the forward path of the substrate transfer unit, after which the substrate is once again supported by the substrate support component.

Page 16, line 14 - page 17, line 4:

The invention of ~~Claim 11~~ the eleventh aspect is a semiconductor manufacturing method including a step of detecting the position of the orientation flat or notch of a substrate and aligning to a specific position, wherein, in the orientation flat or notch alignment of a plurality of substrates, the plurality of substrates are stacked and supported by a substrate support mechanism and rotated all together by the required angle, the orientation flats or notches of all of the substrates are detected by a detection sensor, and the detection information is stored, the substrate support mechanism is rotated on the basis of the detection information, orientation flat or notch alignment is performed for one substrate at a time, each substrate that has undergone orientation flat or notch alignment is retracted from the substrate support mechanism one by one while the position of each substrate in the peripheral direction is maintained, and after the orientation flat or notch alignment and the retraction are finished

for all of the substrates, the retracted substrates are returned to the substrate support mechanism.

Page 18, lines 9-19:

The invention of ~~Claim 12~~ the twelfth aspect is the semiconductor manufacturing method according to ~~Claim 11~~ the invention of the eleventh aspect, including a step of rotating the plurality of substrates all at once by a specified angle when the orientation flat or notch position of the plurality of substrates cannot be detected because the orientation flat or notch position is too far away from the place where the detection sensor is installed, and the orientation flat or notch position is brought closer to the place where the detection sensor is installed, where the orientation flat or notch positions can be detected, through this rotation by the required angle.

Page 19, lines 15-27:

The invention of ~~Claim 13~~ the thirteenth aspect is the semiconductor manufacturing method according to ~~Claim 11~~ the invention of the eleventh aspect, wherein, when the orientation flats or notches of the substrates cannot be detected even when the substrate support mechanism is rotated by the required angle, the following steps (a) to (d) are performed so as to allow orientation flat or notch detection: (a) the substrates are retracted from the substrate support mechanism, (b) the substrate support mechanism is rotated by a specified angle, (c) the substrates are returned to the substrate support mechanism, and (d) the substrate support mechanism is rotated by the required angle and the orientation flat or notch position is detected.

Page 21, lines 10-21:

The invention of ~~Claim 14~~ the fourteenth aspect is the semiconductor manufacturing method according to ~~Claim 11~~ the invention of the eleventh aspect, wherein, in the alignment of the orientation flats or notches of the substrates to a specific position after completion of

the orientation flat or notch position detection operation for all of the substrates, if the orientation flat or notch of the substrate cannot be aligned to the specific position with a single rotation because the orientation flat or notch position is too far away from the specific position, the following steps are repeatedly performed until the orientation flat or notch of the substrate is aligned with the specified position.

Page 22, lines 19-22:

The invention of ~~Claim 15~~ the fifteenth aspect is the semiconductor manufacturing method according to ~~Claim 8~~ the invention of the eighth aspect, wherein orientation flat or notch alignment is performed all at once for a plurality of substrates.

Page 23, lines 20-24:

The invention of ~~Claim 17~~ the seventeenth aspect is the semiconductor manufacturing apparatus according to ~~Claim 16~~ the invention of the sixteenth aspect, wherein a supporting tapered portion is provided to the support component, and the outer periphery of the substrate is supported by this supporting tapered portion.

Page 24, lines 3-6:

The invention of ~~Claim 18~~ the eighteenth aspect is the semiconductor manufacturing apparatus according to ~~Claim 16~~ the invention of the sixteenth aspect, wherein the substrate support component further has a tapered portion for correcting substrate eccentricity.

Page 24, lines 12-16:

The invention of ~~Claim 19~~ the nineteenth aspect is the semiconductor manufacturing apparatus according to ~~any of Claim 16~~ the invention of the sixteenth aspect, having a substrate retraction mechanism for retracting the substrate from the substrate support component of the substrate support mechanism.

Page 25, lines 14-29:

The invention of ~~Claim 20~~ the twentieth aspect is the semiconductor manufacturing apparatus according to ~~Claim 19~~ the invention of the nineteenth aspect, comprising a control component for controlling the substrate support mechanism and the substrate retraction mechanism as in the following (a) to (c): (a) the rotation of the substrate support mechanism is controlled such that the orientation flats or notches of a plurality of substrates are detected and the orientation flats or notches of the substrates are aligned one by one, (b) the substrate retraction mechanism is controlled such that the substrates that have undergone orientation flat or notch alignment are successively retracted from the substrate support mechanism one by one, and (c) the substrate retraction mechanism is controlled such that the plurality of retracted substrate are returned to the substrate support mechanism after completion of the orientation flat or notch alignment of all the substrates.

Page 27, lines 10-17:

The invention of ~~Claim 21~~ the twenty-first aspect is the semiconductor manufacturing apparatus according to ~~Claim 16~~ the invention of the sixteenth aspect, wherein the substrate support mechanism comprises a turntable, a plurality of support poles erected on the turntable, a substrate support component that is provided to each support pole and supports the outer periphery of each of a plurality of substrates, and a single rotary drive component that rotates the turntable.

Page 28, lines 10-20:

The invention of ~~Claim 22~~ the twenty-second aspect is the semiconductor manufacturing apparatus according to ~~Claim 19~~ the invention of the nineteenth aspect, wherein the substrate retraction mechanism comprises a base provided such that it can be raised or lowered, a lifting drive component for raising or lowering the base, a plurality of pick-up poles that are erected on the base and pick up a plurality of substrates one at a time

from the substrate support component as the base is raised and lowered, and a substrate support component that is provided to each of the pick-up poles and supports the outer periphery of the substrate.

Page 29, lines 16-26:

The invention of ~~Claim 23~~ the twenty-third aspect is the semiconductor manufacturing apparatus according to ~~Claim 22~~ the invention of the twenty-second aspect, wherein the substrate support component has a turntable, a plurality of support poles erected on the turntable, a substrate support component that is provided to each support pole and supports the outer periphery of each of a plurality of substrates, and a single rotary drive component that rotates the turntable, wherein the pitch P1 of the substrate support components provided to the pick-up poles and the pitch P2 of the substrate support components of the support poles satisfy the relationship $P1 < P2$.

Page 30, lines 5-11:

The invention of ~~Claim 24~~ the twenty-fourth aspect is the semiconductor manufacturing apparatus according to ~~Claim 23~~ the invention of the twenty-third aspect, wherein when n number of substrates are successively picked up one at a time by the pick-up poles, the pitch P1 of the substrate support components provided to the pick-up poles and the pitch P2 of the substrate support components of the support poles satisfy the relationship $(n - 1)P1 > (n - 2)P2$.

Page 30, lines 23-29:

The invention of ~~Claim 25~~ the twenty-fifth aspect is the semiconductor manufacturing apparatus according to ~~Claim 16~~ the invention of the sixteenth aspect, wherein the detection sensor is constituted such that it moves forward in the inward radial direction of the substrate when detecting the orientation flat or notch, and moves backward in the outward radial direction of the substrate when not detecting.

Page 31, line 19 - page 32, line 3:

The invention of ~~Claim 26~~ the twenty-sixth aspect is a semiconductor manufacturing apparatus equipped with an orientation flat or notch alignment apparatus that performs orientation flat or notch alignment for a plurality of substrates supported horizontally, wherein the substrate alignment apparatus comprises a plurality of turntables provided in a stacked state and sharing a common center of rotation, on each of which is placed one substrate, a plurality of substrate support components provided to the various turntables for supporting the outer periphery of the various substrates, a plurality of rotary drive components for independently rotating each of the plurality of turntables, and a detection sensor for detecting the orientation flats or notches in non-contact fashion.

Page 32, lines 7-10:

The invention of ~~Claim 27~~ the twenty-seventh aspect is the semiconductor manufacturing apparatus according to ~~Claim 26~~ the invention of the twenty-sixth aspect, further comprising a substrate retraction mechanism for retracting the substrates from the substrate support components.

Page 33, lines 5-14:

The invention of ~~Claim 28~~ the twenty-eighth aspect is the semiconductor manufacturing apparatus according to ~~Claim 27~~ the invention of the twenty-seventh aspect, wherein the substrate retraction mechanism comprises a plurality of pick-up poles that are erected such that they can be raised or lowered, and a plurality of substrate support components that are provided to the each pick-up pole, support the substrate outer periphery and pick up the substrates from the substrate support components when raised, and return the substrates that have been picked up to the substrate support components when lowered.

Page 34, lines 7-19:

The invention of ~~Claim 29~~ the twenty-ninth aspect is the semiconductor manufacturing apparatus according to ~~any of Claim 26~~ the invention of the twenty-sixth aspect, wherein the detection sensor and the substrate support components are in a positional relationship such that there is no contact when the substrates are rotated. If the detection sensor and the substrate support components are in a positional relationship such that there is no contact, there will be no restriction on the rotation of the substrate retraction mechanism or turntables, allowing for free rotation, or the orientation flats or notches can be easily detected regardless of where the orientation flat or notch position is, and orientation flat or notch alignment can be carried out more smoothly.

Page 34, line 20 - page 35, line 9:

The invention of ~~Claim 30~~ the thirtieth aspect is the semiconductor manufacturing apparatus according to ~~Claim 29~~ the invention of the twenty-ninth aspect, wherein when the detection sensor is an optical sensor, then the structure in which the detection sensor and the substrate support components are in a non-contact positional relationship is a structure comprising a turntable that is smaller in diameter than the substrates, a substrate support component protruding in the outward radial direction from the turntable and forming a support component that supports the outer periphery of the substrate, and an optical sensor that is outside the turntable in the radial direction and has a light receiving component or light emitting component disposed on the back side of the substrate outer periphery that protrudes out from the smaller-diameter turntable when the substrate is supported by the substrate support component, and a light emitting component or light receiving component disposed on the front side of the substrate outer periphery opposite the light receiving component or light emitting component.

Page 35, lines 26-29:

The invention of ~~Claim 31~~ the thirty-first aspect is the semiconductor manufacturing apparatus according to ~~any of Claim 26~~ the invention of the twenty-sixth aspect, wherein a rotary drive component for rotating the turntable is not disposed beneath the turntable.

Page 36, lines 13-17:

The invention of ~~Claim 32~~ the thirty-second aspect is the semiconductor manufacturing apparatus according to ~~Claim 31~~ the invention of the thirty-first aspect, wherein rotary drive components that are adjacent in the vertical direction are disposed so as to have different centers of rotation.

Page 36, lines 25-29:

The invention of ~~Claim 33~~ the thirty-third aspect is the semiconductor manufacturing apparatus according to ~~any of Claim 26~~ the invention of the twenty-sixth aspect, wherein the substrate support components are transparent. Transparent members are made up of members that are transparent to the light handled by the optical sensor.